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ABSTRACT

Designed for educational psychologists, the paper discusses the range of tests used for assessing visually handicapped children. Specific tests used in Britain for preschool children (including the Williams Intelligence Test for Children with Defective Vision and the Social Maturity Scale for Blind Pre-school Children) and for school aged children (including the Barraga Visual Efficiency Scale and the Look and Think Checklist) are analyzed. Problems with standardized intelligence tests and psychological measures are examined. Tests for assessing tactual reading skills and mathematics skills by visually handicapped children are recommended. Visual acuity and age of onset of visual impairment are explained to be important variables in assessment of the visually handicapped. (CL)

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AN INTRODUCTION TO THE PSYCHOLOGICAL AND EDUCATIONAL ASSESSMENT OF BLIND AND PARTIALLY SIGHTED CHILDREN

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AN INTRODUCTION TO THE PSYCHOLOGICAL AND EDUCATIONAL ASSESSMENT OF BLIND AND PARTIALLY SIGHTED CHILDREN

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INTRODUCTION

The main purpose of this paper is to inform educational psychologists of the range of tests that have been used for assessing visually handicapped children. It does not address itself to the question of why we should assess these children nor does it examine in close detail the wide variety of informal and observational techniques that might be used to extend or complement the information derived from formal testing. The answer to the first question is, in essence, no different from that which would be given vis-a-vis the non-handicapped; practising psychologists are familiar with the arguments and justifications that are deployed in such discussions, and it would be otiose to rehearse them here. The reasons for the scant treatment of observational methods and informal procedures are to do with space rather than with the belief that they can yield no insight into level of functioning; again, the practitioner can be assumed to be fully aware of what can be gained in this way and of the importance of the kind of information about processes and adaptive behaviours that these other methods can provide. In addition, since most psychologists will have relatively few visually handicapped children referred to them — there are probably no more than 3,500 visually handicapped children receiving and requiring special education in England and Wales — it has seemed appropriate to direct attention in the first place mainly to those tests which psychologists are already familiar with in the normal course of their work and which others have used, perhaps in a modified form, with the visually impaired. This paper is intended therefore to build upon an existing foundation of knowledge and expertise that can readily accommodate itself to the differences in style and functioning sometimes evidenced by children suffering from severe visual handicap.

One of the major variables affecting performance is vision itself, and since some 75% of children in schools for the blind are estimated to have visual acuities of 2/60 Snellen and upwards, it is clear that knowledge about visual status will be needed by the psychologist confronted by a child labelled as visually impaired. This information will normally be available on the form (B.D.8) completed by the ophthalmologist but for the most severely impaired child it will be insufficient for determining whether or not he can use sight for directing and monitoring his own performance on some of the tasks presented to him by the psychologist. Further discussion of this problem is provided later in this paper. It is touched upon at this point merely to alert new members of assessment teams to the fact that most 'blind' children can see and that the child's use of his residual vision may in itself be indicative of level of intelligence, of the nature of the family's support and attitude, and of the opportunities for learning already made available to him. For some purposes, the examiner's own informal appraisal of the use of sight — observation of the child's ability to locate a light source (window or electric fitting), to find objects placed in different positions on the table, and to thread a lace through a bead — will show not only what the child can see but also how willing he is to rely on sight, on sight and touch together, and upon touch alone. If 'blindness' is now to be thought of as a continuum, with consequences affecting the kinds of test items that may be selected for presentation, then this is even more obviously the case when it comes to the impairment known as 'partial sight'. Some partially sighted children, such as the high myopes, will be indistinguishable, in terms of visual functioning, from children at the top end of the blindness continuum. Others may have relatively high degrees of visual acuity but, because of their restricted fields of vision or their photophobia, be able to function at optimal levels only under specific conditions of object location, bodily

alignment, or intensity of light. No esoteric training is needed to enable the psychologist to acquire some useful information over and above that provided by the ophthalmologist about the kinds of tasks the child can tackle on a visual basis. What is required is the understanding that such information must be actively sought and used as part of the psychological/educational assessment procedure.

Another potentially important variable is age of onset of visual impairment. This is usually shown in the school medical records, but where this is not the case the psychologist will need to check with parents and/or medical advisers because age of onset may affect current levels of functioning in two ways. In the first place, it is argued that children who have "lost their sight before they were 5 to 7 years of age do not retain a useful visual imagery nor most likely any colour ideas..... (whereas those) who lose their sight later in life may retain visual imagery and colour ideas of which they make use in their learning processes" (Lowenfeld, 1974, p.32). If Lowenfeld is right, then the child who has had adequate vision may approach psychomotor tasks with greater confidence and more-precisely co-ordinated skills than his congenitally blind peers. It may well be, too, that even on the vocabulary scales of tests such as the W.I.S.C. and the Williams Intelligence Test for Children with Defective Vision, the child who has had sight will have a wider range of referents and exemplars of the concepts embodied in the test items. Secondly, the age of onset will be of significance to the tester who is examining a child still in the process of adjustment to adventitious blindness. Apart from the obvious effects on school achievement — with 'backwardness' in reading, for example, being attributable to the temporary problems associated with change from print to braille or from print to 'large print' — the late onset of blindness is likely to limit mobility, to increase dependence on others, and to lead to emotional and behavioural disturbances. More than normal care will be needed therefore in interpreting the results of formal testing carried out during the initial period of adjustment to blindness.

PRE-SCHOOL CHILDREN

There are two tests regularly used in Great Britain with the pre-school blind child. The first, the Williams Intelligence Test for Children with Defective Vision (Williams, 1956), will be discussed in greater detail below in relation to the school-age child. It is the only British test that has been constructed and standardized for use with the visually handicapped over a wide age-range, its lower limit being 3 years 6 months. In the light of the author's own statement that the scale is most reliable within the age-range 7 to 13 years, it is clear that its use with the very young child is likely to give rise to difficulties of administration and interpretation. However, practitioners familiar with Form M of the 1937 revision of the Terman-Merrill, with the W.I.S.C. Vocabulary Scale, and some of the intelligence and reasoning tests devised by Burt and Valentine will recognize many of the items appearing in the Williams Test. It is almost predominantly verbal in nature; there are, however, two bead-chain items and, for use only in the lower part of the scale, four other performance-type items. These four (sorting buttons, matching objects, matching forms, and identification of 'mutilated objects') are not scored but are useful for providing variety for the youngest children and to enable the tester to evaluate dexterity and the child's tactual perception ability.

The other instrument now being regularly used is the Social Maturity Scale for Blind Pre-school Children (Maxfield and Buchholz, 1957). This is an adaptation of the original Vineland Scale and while the adaptors emphasize that it is not to be thought of as a test of potential but merely as a measure of realised maturity, nevertheless there is evidence that social maturity is related to some aspects of intelligence. Gillman and Goddard

(1974), for example, found a significant correlation between social quotient, as measured before the age of six, and I.Q., as measured with the W.I.S.C. after the age of six, among a group of blind children. As much assessment of young handicapped children is undertaken for the purpose of deciding whether early intervention/remedial programmes should be instituted, the Maxfield-Buchholz Scale may prove valuable as a means of obtaining some rather global impression of a child's general level of development and to pinpoint specific 'lags' in the child's development, e.g. failure to move around a familiar room unattended before the age of two or to initiate his own play activity by age three. The fact that the scale was originally intended to be administered by checking through the items with the child's parents does not preclude its completion as a result of the psychologist's own observation in school or home, nor, indeed, as a result of discussions with other care-givers.

The instruments best known to psychologists — the W.P.P.S.I., Bayley, and Gesell, scales — have been used very little in this country. Despite this, and the fact that they have not been standardized with the visually handicapped in mind, there is no doubt that many of the items can be used with such infants and, in the writer's opinion, even with some deaf-blind children. In these instances, the test items would be serving as a structured method of observing behaviour, and the failure to derive scores at the end of the procedure would be of little importance to the psychologist concerned with suggesting appropriate 'next stage' activities for implementation by parents and pre-school counsellors. To this end, the Griffiths Scale (Griffiths, 1954) with its examination of development in locomotor, personal/social, hearing/speech, hand/eye, and performance skills can be of considerable assistance, especially with those children retaining some useful vision. Even with the totally blind, it is probably more informative than the alternative Bayley Scales. Criticisms of the validity and independence of the sub-scales and about the inadequacy of the standardization procedures even with the sighted population for whom the Griffiths Scale was devised should not dissuade practising psychologists from taking advantage of an instrument that focusses attention upon what are generally regarded as significant markers of developmental progress.

For some years, Reynell and Zinkin (1975) have been working on the design of a set of techniques for assessing very young children suffering from a combination of visual and other handicaps. The skills of paediatrician and psychologist are being harnessed to devise procedures for assessment of development in the "basic manipulative, locomotor, and reflex functions..... (and those) which are concerned with learning and have a mainly intellectual component." It can be expected that the Reynell-Zinkin scales will constitute a significant contribution to our understanding of, and modes of assessing, the blind baby and infant.

All testing of the young visually handicapped child is likely to be contaminated by the effects of the impairment on the development of the 'intact' senses. The still widespread belief that the blind are somehow compensated for their loss of sight by the possession of superior touch and hearing cannot be easily scotched. That the exact opposite is the case is suggested by Gomulicki (1961) who found in an investigation of the development of perception in the blind that, as compared with their sighted peers, they were significantly inferior over a wide range of tactual and auditory perceptual skills. Although Gomulicki observed the gradual disappearance of the disparity as chronological age increased, he inferred that the absence of the integrative function of vision made the development of the "effective use of the other senses..... particularly difficult". The problem the psychologist has to resolve when seeking to determine current level of functioning is thus rendered more intractable. The child's failure to respond

'correctly' may be due to defects in sensory and motor functions not associated in any direct, or immediately obvious, way to the primary physical impairment. It is for this reason that the results of investigations comparing the performance of blind and sighted subjects will need to be examined with care, especially when essential changes in method of presentation and in permitted mode of response may infringe the strict rubric of the test manual; any profile of performance is certain to be inaccurate, however, unless it has been prepared on the basis of tasks that provide the child with adequate information about what is required. The sighted infant can see simultaneously both elements of the typical form-board 'game', can follow the tester's line of vision, and can obtain visual feed-back about the progress of his attempt. Blindness will make orientation to the problem and awareness of what is required more heavily dependent upon establishment of good rapport and upon the tester's use of language. Where hearing and touch are still in the process of refinement, the tester must be alert to new sources of ambiguity and error.

CHILDREN AT SCHOOL

It was stated in the introduction that the psychological assessment would need to take into account the child's residual vision. There are now two instruments that can be used for this purpose. The first of them, the Barraga Visual Efficiency Scale (Barraga, 1964 and 1970), contains four sub-scales designed to evaluate the child's ability to respond — usually on a matching-to-sample basis — to items of increasing complexity in size, detail, and interpretation. The first section consists of 12 items "related to the discrimination and matching of geometric form, object contour, light-dark intensity, and size and position in space. Section two..... requires the discrimination and matching of figure size, object and abstract figure detail, position of figures in space, and image constancy of outlines, pattern details, and objects. The third..... presents items for visual closure of figures, spatial perspective of figure outlines..... (and the fourth) requires the discrimination of size, position, sequence, and relationship of letter and word symbols....." (Barraga, 1970). Although the scale only contains items presented in two-dimensional format, the associated teaching activities and materials for the development of visual perceptual abilities comprise two and three-dimensional objects. Within the United States, investigations have been carried out to assess the validity and reliability of the test (e.g. Harley and Spollen, 1973, and Harley, Spollen, and Long, 1973). In this country, Tobin (1972a) examined the effectiveness of the suggested teaching procedures for children registered as blind, and Foster (1973) described an investigation "designed to observe the V.E.S. in operation with partially sighted children, and with sighted children who were to act as a baseline for comparison". One consequence of Foster's study is a revised set of instructions for administering the scale to British children. The 48 items that make up the test can be presented quickly and easily, no verbal responses being called for from the child, and constitute an efficient method of obtaining information about the visual discriminations the child can make, particularly in relation to tasks relevant to classroom learning.

An extension of the Barraga Scale is the "Look and Think Checklist" (Tobin, Tooze, Chapman, and Moss, in print). This instrument was devised primarily for use by teachers of the visually handicapped. No 'score' or quotient can be derived but the child's performance can be observed on what the authors describe as "eighteen skill units covering aspects of the traditional areas of object, form and outline, space, movement, and colour perception..... The arrangement of the units takes account of ease of administration, with four units using concrete objects preceding these (9) presented in 2-D format. These are followed by three units in which the

child or teacher acts or draws..... The list then finishes with two units concerned with colour discrimination" (Tobin, et al, ibid). It is claimed that the Checklist is an inventory, tabulating what the experienced teacher would note over an extended period of classroom observation. This measure, like the Barraga, is linked to a set of teaching activities. Its value to the educational psychologist may reside in its attempt at comprehensiveness and in its flexibility. That is, it covers a wide range of visual behaviours and can be administered in whole or part, depending upon the tester's own on-going evaluation of the child's performance: the 'blind' child may be able to cope only with the units containing three-dimensional objects while the partially sighted child could be allowed to skip these sections if previous observation suggests they may be too easy.

The Barraga and the Look and Think instruments will, as tests of visual perception, yield something more than merely an understanding of what the five or six year old can see. They will, for example, indicate whether he can use verbal labels related to size and space and to a variety of relational concepts. With this information, the tester will be in a better position to judge whether anything is likely to be gained from the administration of more familiar tests. The child able to cope with all the two-dimensional items of these measures will almost certainly be able to make a start on tests of receptive language abilities such as the Peabody and the English Picture Vocabulary Test. However, Foster (1973) has found significant differences between sighted and partially sighted juniors (age range: 9.0 - 10.5 years) on the E.P.V.T. No attempt has yet been made to obtain normative data for visually handicapped children at different age levels, and it would seem that the E.P.V.T. should only be employed at present in a rather tentative, exploratory way as an additional means of building up an understanding of a child's attainment. Since some visually handicapped children with restricted fields of vision will not see the whole page at once, it will be necessary to ensure that they examine all four pictures before offering a response; other pre-requisites are the provision of adequate lighting and, in some cases, an angled book-stand at ninety degrees to the line of sight.

In his review of intelligence testing for the visually impaired, Kolk (1977) states that "one of the first questions asked is whether the blind obtain scores on intelligence tests that are equivalent to the sighted population". He infers from the studies reviewed that, "in general, average I.Q. scores do not differ significantly". Evidence for this conclusion may be found in the American reports of Rich and Anderson (1968), Jordan and Felty (1968), and, in the Netherlands, of Smits and Mommers (1976). In these three investigations, one of the principal instruments was the W.I.S.C. As this instrument is so familiar to British psychologists, it will readily recommend itself for use with the visually handicapped. However, it has never been standardized on this group of children and it is for this reason that the attention of would-be testers is drawn to Tillman's findings (Tillman, 1967(a) and (b) and 1973). Using the verbal sub-scales of the W.I.S.C. with 55 blind boys and 55 blind girls, mean age 9.9 years, matched on age with sighted controls, Tillman reported a significant superiority on mean I.Q. for the sighted group. Sub-scale analyses showed the sighted to be superior on the comprehension and similarities scales but no differences emerged on the information, arithmetic, and vocabulary scales. The reliability of the scales was lower for the blind, especially on those scales where they were inferior to the sighted. Digit span scores were not available for all the children in the sighted group, and it is interesting to note that the mean I.Q. of the blind group, for whom digit span scores were available, was increased by the inclusion of this scale to an extent that eliminated the overall inferiority stemming from the inferiorities on the comprehension and similarities scales. [In a longitudinal study of

cognitive development and school achievement, the writer has observed that at age five/six, the blind already seem to be performing at a higher level on digit and letter span tests than the partially sighted. Other investigators, e.g. Bauman (1976), Smits and Mommers (1976), and Levitt et al (1972) have also reported superior performance on digit span tasks by the blind.] Tillman suggested that when the W.I.S.C. is used with blind children, one reasonable method for calculating an overall I.Q. would be by pro-rating from performance on the arithmetic, information, and vocabulary scales. From a subsequent factor analysis of his data, he inferred that the blind show a lack of integration among their educational experiences, each bit of knowledge being isolated and cast into a separate frame of reference. Verbal abilities were seen as focussing on a "basic vocabulary without much elaboration" and the blind children tended "to approach abstract conceptualization problems from a concrete and functional level".

As already mentioned, the Williams Intelligence Test (Williams, 1956) is the only British test that has been standardized for use with visually handicapped children over the whole school age-range. The population for whom it is intended consists of children aged 3.5 to 16.0 years, with visual acuities ranging upwards from nil to 6/60 Snellen (and up to 6/36 Snellen where there is a narrowing of the field of vision). The measure contains a separate, 40-item vocabulary test almost identical with the W.I.S.C. vocabulary sub-scale. As in administering any test to a child with defective sight, users of the Williams find it is important to make the instructions clear and unambiguous, to use voice intonation and stress changes for signalling beginnings and endings of tasks, to remove the sources of extraneous sounds, and in the items that are timed or presented only once to make these requirements clearly understood in advance. Few items require knowledge of braille but for those that do, the examiner must be prepared to spend some time to become knowledgeable about the kinds of reversal or inversion errors that a child might make. Despite the fact that the test has now been in use for over twenty years, little information is available about validity and reliability. In a paper now in the course of preparation, the writer reports changes in I.Q. observed over a two-year period and sets these individual variations against an apparently highly satisfactory overall test/re-test correlation of +0.89 (N = 99).

The performance scales of the W.I.S.C. pose great problems for the visually handicapped and no consistent effort has been made to explore possible modifications that would enable them to be presented to this group. The value of the W.I.S.C. and the Williams is much reduced therefore by their inability to tap and assess important aspects of intellectual functioning. Attempts to fill the gap by means of a tactile version of Ravens Matrices have not been followed through to a stage that would allow practitioners to place any great confidence in the diagnostic or predictive value of the procedures, the devisers/adaptors of the instrument having themselves noted that there is still a need for more research before it could be used on a clinical basis (Rich and Anderson, 1965). At the upper end of the age range and in a rather different area of functioning, there has been an effort to modify existing, objective tests of aptitude and performance. Bauman (1946, 1950(a), and 1951), for example, adapted the Pennsylvania Bi-Manual Worksample, the Minnesota Rate of Manipulation, and the Small Parts Dexterity Tests for the blind. Curtis (1950) and Hoffman (1958) have expressed confidence in the Purdue Pegboard as a significant addition to the armoury of tests available for this purpose and have reported that it has been one of the best predictors of manual work success. Tobin and Hunter (1974) have also published data on the performance on this test of 100 blind and partially sighted adolescents in Great Britain; comparison with the sighted norms reveals that for the "Assembly" task the 99th

percentile for the visually handicapped corresponds to the 45th percentile for the sighted; significant correlations are also reported between performance on the Purdue Assembly Test and teacher-ratings on "pre-engineering workshop" and "typewriting" skills. Perhaps of more practical import is the implication that observation of the way a subject tackles the problems can serve to produce a more detailed and comprehensive picture of his strengths and weaknesses, particularly in terms of 'handedness', use of residual vision, persistence, psycho-motor skills, and differences in speed as between first and last trials.

Much of the work on personality development in the young visually handicapped child has been undertaken by investigators with a psycho-analytic orientation, and there are therefore few 'tests' readily available for use in assessment. The work of Burlingham (e.g. 1961 and 1965), Sandler (1963), and of Wills (1970) admirably illustrates the insights to be gained from this approach. As would be expected, it is in the United States that investigators have made the greatest use of objective measures of personality. Among the specially-designed instruments is Hardy's Anxiety Scale for the Blind (Hardy, 1967 and 1968). This is a simple 'true-false' test, consisting of 78 items that can be administered by providing the child with a roll of tickets or other tokens to be placed in specified positions indicating true or false as the tester reads the items aloud. It is described as a measure of manifest anxiety in blind and partially sighted adolescents and young adults, and has much in common with the Taylor Manifest Anxiety Scale, the reported correlation between them being +0.74. Other tests designed for and validated on visually handicapped subjects are Bauman's Emotional Factors Inventory and Adolescent Emotional Factors Inventory (vide Bauman, 1950, 1954, and 1971, and Romig and Van Atta, 1970). They can be administered in large print format for those with sufficient vision or on tape for the more severely impaired. The sub-scales cover sensitivity, somatic symptoms of inner tension, social competence, paranoia, feelings of inadequacy, depression, and attitudes to blindness. In Great Britain, the writer's own exploration of the Eysenck Personality Questionnaire in a longitudinal investigation of development suggests that it may be valuable as one means of picking out the young child highly-deviant on one factor, particularly psychoticism; the information thus obtained by the psychologist can be helpful for teachers and child-care staff in terms of a deeper understanding of the child and even for planning support, therapeutic, or behaviour-control programmes. As in most personality testing of children, however, the test-re-test reliabilities have not been sufficiently high, certainly vis-a-vis this group of eight and nine year olds over a six to ten month interval, to warrant placing anything more than moderate confidence in the scales (the reliability co-efficients on the E, N, and P scales have ranged from a low of +0.40 up to a maximum of +0.58, the girls' scores tending to be more consistent over time than the boys). Indeed the whole question of whether the visually handicapped differ in personality from their sighted peers — and this is a question lying implicit in many of the investigations in this area — is incapable of solution until instruments have been developed that reach standards of validity and reliability higher than at present achieved. A distinction needs to be made therefore between the kinds of measures devised specifically for the visually handicapped, like those of Hardy and Bauman, and those standardized on a sighted population. The former do not readily lend themselves to answering questions about possible differences between the two groups because, in fact, the devisers seem to be assuming that such differences are already known to exist. The latter are potentially more useful for the purpose but their value is vitiated by their low reliability. Two studies that have made use of existing tests are those of Zahran (1965) and Greenberg and Jordan (1957). Zahran found no statistically significant differences between his blind and sighted groups on the neuroticism scale of the Junior Maudsley; Greenberg and Jordan also

found no differences in neuroticism as between their more-severely and less-severely impaired adolescent groups on the Bernreuter Personality Inventory.

The psychologist who needs to assess tactual reading skills has three tests available to him. All three can be administered straight from the manuals even by those who know no braille. In that case, however, little more can be derived from them than reading ages or quotients. For diagnostic purposes, the tester must be able to read braille sufficiently well to identify the reversal and inversion errors that the braille code can give rise to, since its punctiform, rectilinear format is productive of such errors to a far greater extent than its ink-print counterpart. Furthermore, Standard English Braille consists of a large number of contracted forms — for words and two, three, four, and five-letter combinations. The rules governing their use — all aimed at reducing bulk and scanning/cover times — are also numerous and complex. Even by early adolescence some children will not have learned all the forms that might occur, especially those with a relatively low frequency of occurrence. The educational psychologist may therefore be tempted to omit the administration of tests of reading or to pass the job over to his teacher colleagues. Where assessment is carried out on a team basis, this may be defended, and even considered beneficial for team morale. In other circumstances, the onus is surely upon the psychologist to acquire the necessary skills. The Royal National Institute for the Blind publishes a Braille Primer in ink-print and this describes the code and lists all the rules. It is not necessary for the tester to be able to read braille by touch; sight-reading is all that is required to enable the tester to monitor and understand the child's progress on any of the three objective measures that are currently available. The Tooze Braille Speed Test (Tooze, 1962) is easiest to administer and requires least knowledge of braille, all 120 words being in uncontracted braille, no word consisting of more than three letters, and the whole test lasting only one minute. The Lorimer Braille Recognition Test (Lorimer, 1962) is also a word-recognition test. It is untimed, however, and is terminated when the child has made eight consecutive errors. More knowledge of the code is needed as contracted word and letter forms feature prominently in the lists. The recently standardized braille version of the Neale Analysis of Reading Ability is a significant addition to the test collection (Lorimer, 1977), making it possible at long last for assessment to be made of reading speed, reading accuracy, and reading comprehension by means of a single instrument. Lorimer has adapted the Neale test by replacing the introductory pictorial 'cues' with a short oral description of the setting that helps to orient the blind reader, and by extending the 'pause before correction' to allow the child more time to identify and 'un-pack' the contracted forms. The re-standardizing of the test now makes it possible, where desired, to compare a blind reader with his blind and sighted peers. More importantly, its diagnostic potential is now available to those teachers and psychologists working with blind children.

For the partially sighted reader of ink-print the Neale test is also recommended. The first two passages have been found by the writer to present no special difficulties to such children, the type-face and size being easily legible when the appropriate spectacles or prescribed low-vision aids are worn. The later passages have also been acceptable to most pupils despite the reduction in print size; for some, however, it may be advisable for these passages to be re-written on a large-face type-writer. In general, the tester must expect to find a considerable reduction in reading rate among both the blind and the partially sighted, certainly of the order of twelve to eighteen months at nine or ten years of age. The Neale sub-scales are not independent, and the lower level of performance on the speed and accuracy scales will inevitably lead to an apparent retardation on the comprehension measure, a retardation not attributable to innate capacity, poor teaching/learning, or other organismic/

environmental factors. In most cases, the testing will be terminated well before the child has reached the limits of his comprehension if the rubric is strictly obeyed. Users may therefore be well advised to 'score' the test according to the rubric but to explore the child's competence in more detail by continuing beyond the passage in which the error ceiling is reached. This may be strongly indicated in 'integrated' settings where non-specialist teachers will wish to know whether the pupil's understanding of his reading materials is significantly better than his general speed and accuracy would seem to suggest. As a very-rapidly and easily administered measure, the writer would recommend the Salford Test which he has found to be highly correlated with the Neale Accuracy Scales ($r = +0.959$, $N = 50$).

Modern mathematics teaching with its emphasis on learning by discovery and on the recording and interpretation of data in graphic form can present special difficulties to the visually handicapped. Currently, trials are being conducted with individually-administered, modified tactile and enlarged print versions of N.F.E.R. Mathematics Attainments Tests 231A and 190A as part of the longitudinal study mentioned earlier. As is to be expected, performance on these tests is affected by factors other than those related directly to the visual handicap. Schools have different policies as to the timing and placing in the curriculum of the operations and concept-areas traditionally associated with infant and primary school mathematics. Nevertheless, since both these tests include items covering all the major concept-areas, they can be used selectively and diagnostically. Until the commercial production of tactile and large-print forms can be arranged, educational psychologists will be dependent upon the special schools for technical help in modifying the tests for these children. The new practitioners will also need the assistance of the specialist teachers to unravel the problems arising from the braille mathematics code. Perhaps it is here that the psychologist's role as a member of an assessment team is most clearly brought out.

CONCLUSION

Lowenfeld (1948) has argued that restrictions on development that might be expected as a consequence of blindness are to do with the lack of ease and freedom in movement, with the range and variety of experiences, and with the difficulty in controlling the environment and the 'self' in relation to that environment. Wills (1965) has perhaps made a somewhat related point when talking of the absence of "a major sense such as vision" leading to the child's understanding "his world later and in a different way from a child with full sensory equipment". Some writers have suggested, like Foulke (1962), that the visually handicapped child is more likely to be dependent upon second-hand experience, particularly that which can be expressed and shared through language. Associated with this dependence may be a kind of 'verbalism' in which concepts are capable of being understood and extended primarily through the medium of language, and only rarely through direct experience. If the general theme of these commentators is valid, then one would expect development to be retarded in some areas. The evidence of this, while not unequivocal, is fairly substantial. Fraiberg (1968) has observed a delay in achievement of the object concept in infancy. Friedman and Pasnak (1973) have reported the significant superiority of sighted eleven year olds on tasks involving classification and seriation skills. Researchers such as Hatwell (1966), Miller (1969), Tobin (1972b), and Gottesman (1973) have used various conservation tasks and have inferred that there is a kind of developmental 'lag' or delay among the visually handicapped (for a contrary view, vide Gromer (1973)). If development is indeed affected by severe visual

impairment, then the dearth of objective tests standardized on these children would seem to be a matter of grave concern. However, there can be little doubt that developmentally, and in every other way, such children have more things in common with their sighted peers than things that separate them. For this reason, the educational psychologist is surely justified in using familiar tests and other structured observational procedures when assisting in the assessment of the blind or partially sighted child. The 'inadequacy' of the techniques merely serves to point up even more emphatically the importance of such assessment being organised on an interdisciplinary, team basis.

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